

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

|  |   |   |
|--|---|---|
| Applicant's or agent's file reference<br>P041345P0   | <b>FOR FURTHER ACTION</b>   | See item 4 below  |
| International application No.<br>PCT/JP2006/300343   | International filing date ( <i>day/month/year</i> )<br>13 January 2006 (13.01.2006) | Priority date ( <i>day/month/year</i> )<br>14 January 2005 (14.01.2005) |
| International Patent Classification (8th edition unless older edition indicated)<br>See relevant information in Form PCT/ISA/237 |   |   |
| Applicant<br>MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.  |   |   |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

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|---|---|
| The International Bureau of WIPO<br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland<br><br>Facsimile No. +41 22 338 82 70 | Date of issuance of this report<br>17 July 2007 (17.07.2007)<br><br>Authorized officer<br><br><div style="text-align: center; font-weight: bold; font-size: 1.2em;">Yoshiko Kuwahara</div><br><br>e-mail: pt07.pct@wipo.int |
|---|---|

# 特許協力条約

発信人 日本国特許庁（国際調査機関）

|   |                             |   |  |
|---|-----------------------------|---|--|
| 代理人<br>岩橋 文雄<br>様   |                             | PCT<br>国際調査機関の見解書<br>(法施行規則第40条の2)<br>[PCT規則43の2.1] |  |
| あて名<br>〒571-8501<br>大阪府門真市大字門真1006番地<br>松下電器産業株式会社内                           |                             | 発送日<br>(日.月.年) 18.04.2006                           |  |
| 出願人又は代理人<br>の書類記号 P041345P0   |                             | 今後の手続きについては、下記2を参照すること。                             |  |
| 国際出願番号<br>PCT/J P 2006/300343   | 国際出願日<br>(日.月.年) 13.01.2006 | 優先日<br>(日.月.年) 14.01.2005                           |  |
| 国際特許分類 (IPC) Int.Cl. H01M4/02(2006.01), H01M4/58(2006.01), H01M10/40(2006.01) |                             |   |  |
| 出願人 (氏名又は名称)<br>松下電器産業株式会社  |                             |   |  |

1. この見解書は次の内容を含む。

- ☒ 第I欄 見解の基礎
- ☐ 第II欄 優先権
- ☐ 第III欄 新規性、進歩性又は産業上の利用可能性についての見解の不作成
- ☐ 第IV欄 発明の単一性の欠如
- ☒ 第V欄 PCT規則43の2.1(a)(i)に規定する新規性、進歩性又は産業上の利用可能性についての見解、それを裏付けるための文献及び説明
- ☐ 第VI欄 ある種の引用文献
- ☐ 第VII欄 国際出願の不備
- ☒ 第VIII欄 国際出願に対する意見

2. 今後の手続き

国際予備審査の請求がされた場合は、出願人がこの国際調査機関とは異なる国際予備審査機関を選択し、かつ、その国際予備審査機関がPCT規則66.1の2(b)の規定に基づいて国際調査機関の見解書を国際予備審査機関の見解書とみなさない旨を国際事務局に通知していた場合を除いて、この見解書は国際予備審査機関の最初の見解書とみなされる。

この見解書が上記のように国際予備審査機関の見解書とみなされる場合、様式PCT/ISA/220を送付した日から3月又は優先日から22月のうちいずれか遅く満了する期限が経過するまでに、出願人は国際予備審査機関に、適当な場合は補正書とともに、答弁書を提出することができる。

さらなる選択肢は、様式PCT/ISA/220を参照すること。

3. さらなる詳細は、様式PCT/ISA/220の備考を参照すること。

|  |                                   |     |         |
|--|-----------------------------------|-----|---------|
| 見解書を作成した日<br>06.04.2006  |                                   |     |         |
| 名称及びあて先<br>日本国特許庁 (ISA/J P)<br>郵便番号100-8915<br>東京都千代田区霞が関三丁目4番3号 | 特許庁審査官 (権限のある職員)                  | 4 X | 3 5 5 9 |
|  | 原 賢一<br>電話番号 03-3581-1101 内線 3477 |     |         |

様式PCT/ISA/237 (表紙) (2005年4月)

## 第 I 欄 見解の基礎

1. 言語に関し、この見解書は以下のものに基づき作成した。

☒ 出願時の言語による国際出願

☐ 出願時の言語から国際調査のための言語である \_\_\_\_\_ 語に翻訳された、この国際出願の翻訳文  
(PCT規則12.3(a)及び23.1(b))

2. この国際出願で開示されかつ請求の範囲に係る発明に不可欠なヌクレオチド又はアミノ酸配列に関して、  
以下に基づき見解書を作成した。

a. タイプ ☐ 配列表

☐ 配列表に関連するテーブル

b. フォーマット ☐ 紙形式

☐ 電子形式

c. 提出時期 ☐ 出願時の国際出願に含まれていたもの

☐ この国際出願と共に電子形式により提出されたもの

☐ 出願後に、調査のために、この国際調査機関に提出されたもの

3. ☐ さらに、配列表又は配列表に関連するテーブルを提出した場合に、出願後に提出した配列若しくは追加して提出した配列が出願時に提出した配列と同一である旨、又は、出願時の開示を超える事項を含まない旨の陳述書の提出があった。

4. 補足意見：

第V欄 新規性、進歩性又は産業上の利用可能性についてのPCT規則43の2.1(a)(i)に定める見解、  
それを裏付ける文献及び説明

## 1. 見解

|                |       |      |        |
|----------------|-------|------|--------|
| 新規性 (N)        | 請求の範囲 | 3, 4 | 有<br>無 |
|                | 請求の範囲 | 1, 2 |        |
| 進歩性 (IS)       | 請求の範囲 |      | 有<br>無 |
|                | 請求の範囲 | 1-4  |        |
| 産業上の利用可能性 (IA) | 請求の範囲 | 1-4  | 有<br>無 |
|                | 請求の範囲 |      |        |

## 2. 文献及び説明

文献1 : JP 2004-134207 A (ソニー株式会社) 2004. 04. 30, 【請求項1】、【請求項2】、  
【0013】、【0015】、【0048】 - 【0051】  
文献2 : JP 9-293538 A (富士写真フイルム株式会社) 1997. 11. 11, 【請求項3】  
文献3 : JP 2004-265806 A (キヤノン株式会社) 2004. 09. 24, 【請求項1】、【実施例  
1】  
文献4 : JP 2001-76727 A (ソニー株式会社) 2001. 03. 23, 【0003】  
文献5 : JP 2004-362777 A (日立マクセル株式会社) 2004. 12. 24, 【請求項2】  
文献6 : JP 2003-346799 A (日本電池株式会社) 2003. 12. 05, 【請求項1】  
文献7 : JP 2004-335186 A (日立マクセル株式会社) 2004. 11. 25, 【請求項2】  
文献8 : JP 2003-173776 A (ソニー株式会社) 2003. 06. 20, 全文  
文献9 : JP 2003-238165 A (日立マクセル株式会社) 2003. 08. 27, 【請求項10】、【0001】  
文献10 : JP 8-213015 A (ソニー株式会社) 1996. 08. 20, 【請求項1】  
文献11 : JP 2004-335278 A (日亜化学工業株式会社) 2004. 11. 25, 【請求項5】、【0055】  
文献12 : JP 2004-235144 A (日亜化学工業株式会社) 2004. 08. 19, 【請求項12】  
文献13 : JP 2003-7299 A (三星エスディアイ株式会社) 2003. 01. 10, 【請求項1】、  
【請求項11】、【請求項13】、【請求項14】、【0056】、【0060】 - 【0062】、【0087】、【図6】

## 第Ⅶ欄 国際出願に対する意見

請求の範囲、明細書及び図面の明瞭性又は請求の範囲の明細書による十分な裏付についての意見を次に示す。

請求の範囲 2、[0007] 及び [0021] の「容量」は、明細書の「組成物 A または B の混合（添加）量が重量部で示されている」（実施例、比較例及び [表 1]）の記載によれば、重量であると云える。しかしながら、上記記載の「容量」は、重量ではなく、放電容量、容積等の意味にも解されるから、不明瞭である。

[表 1] の「100W 放電容量 (%)」及び「放電時変曲電圧 (V)」は、明細書に何を意味するのかの説明がないから、上記記載は不明瞭である。

## 補充欄

いずれかの欄の大きさが足りない場合

## 第 V 欄の続き

請求の範囲 1 及び 2 に係る発明は、国際調査報告で引用された文献 1 により、新規性、進歩性を有しない。

文献 1 には、「リチウム遷移金属複合酸化物を活物質とする正極と、人造黒鉛負極と、前記正極と前記負極とに介在する多孔性ポリオレフィンフィルムと、非水電解液を有する非水電解質二次電池であって、前記正極は、第 1 のリチウム遷移金属複合酸化物と、平均放電電圧が前記第 1 のリチウム遷移金属複合酸化物よりも 0.05 V 以上低い第 2 のリチウム遷移金属複合酸化物を正極活物質として含有し、前記第 2 のリチウム遷移金属複合酸化物が 4～50% の割合で含有されている非水電解質二次電池。」の発明が記載されている。(以下、「文献 1 発明」という。)

文献 1 発明の「第 1 のリチウム遷移金属複合酸化物」、「第 2 のリチウム遷移金属複合酸化物」は、平均放電電圧が第 1 のリチウム遷移金属複合酸化物よりも第 2 のリチウム遷移金属複合酸化物の方が低いから、それぞれ、請求の範囲 2 に係る発明の「第 1 活物質」、「第 2 活物質」に相当する。

そして、請求の範囲 2 に係る発明の「第 2 活物質の容量」は、明細書【0024】及び実施例によれば、「第 2 活物質の重量」であると認められるから、文献 1 発明の第 2 のリチウム遷移金属複合酸化物の重量(%)は、請求の範囲 2 に係る発明の数値範囲に重複する範囲を含む。

してみると、文献 1 発明は、請求の範囲 2 に係る発明と同様の発明であるから、文献 1 発明の放電曲線も、請求の範囲 1 に係る発明と同様に、放電末期の 5% 以上 20% 以下の領域において、ステップ状の変曲点を 2 つ以上有するものと云える。

請求の範囲 3 に係る発明は、文献 1 と国際調査報告で引用された文献 2－7 とにより、進歩性を有しない。

例えば、文献 2－4 にも記載されるように、請求の範囲 3 に係る発明の第 1 活物質は非水電解質二次電池用正極活物質として周知である。そして、例えば、文献 5－7 にも記載されるように、 $\text{LiMnO}_2$  は、非水電解質二次電池用正極活物質として周知であるから、文献 1 発明の正極活物質を「請求の範囲 3 に係る発明の第 1 活物質」及び「 $\text{LiMnO}_2$ 」とする程度のこととは当業者が容易になし得ることである。その際に、「請求の範囲 3 に係る発明の第 1 活物質」、「 $\text{LiMnO}_2$ 」の平均放電電圧を測定して平均放電電圧値の高いものと低いものを決めた結果、文献 1 発明の「第 1 のリチウム遷移金属複合酸化物」、「第 2 のリチウム遷移金属複合酸化物」を、それぞれ、「請求の範囲 3 に係る発明の第 1 活物質」、「 $\text{LiMnO}_2$ 」とする程度のこととも、当業者が容易になし得ることである。

請求の範囲 4 に係る発明は、文献 1、文献 5－7 及び国際調査報告で引用された文献 8－12 とにより、進歩性を有しない。

例えば、文献 8－10 にも記載されるように、請求の範囲 4 に係る発明の Mn を含む複合酸化物は、非水電解質二次電池用正極活物質として周知である。そして、例えば、文献 10－12 にも記載されるように、請求の範囲 4 に係る発明の Al を含む複



## 補充欄

いずれかの欄の大きさが足りない場合

## 第 V 欄の続き

合酸化物は、非水電解質二次電池用正極活物質として周知であるから、文献1発明の正極活物質を「請求の範囲4に係る発明のMnまたはAlを含む複合酸化物」及び「 $\text{LiMnO}_2$ 」とする程度のことは当業者が容易になし得ることである。その際に、「請求の範囲3に係る発明の第1活物質」、「 $\text{LiMnO}_2$ 」の平均放電電圧をそれぞれ測定して、文献1発明の「第1のリチウム遷移金属複合酸化物」、「第2のリチウム遷移金属複合酸化物」を、それぞれ、「請求の範囲4に係る発明のMnまたはAlを含む複合酸化物」、「 $\text{LiMnO}_2$ 」とする程度のことも、当業者が容易になし得ることである。

請求の範囲1に係る発明は、国際調査報告で引用された文献13により、新規性、進歩性を有しない。

文献13には、「表面処理層を有するリチウム金属酸化物を活物質とする正極と、リチウムイオンの挿入／脱離が可逆的に可能な物質を負極として有するリチウムイオン電池。」の発明が記載されている。(以下、「文献13発明」という。)

文献13発明と請求の範囲1に係る発明は、請求の範囲1に係る発明では、放電曲線に関する規定を有しているのに対し、文献13発明では、放電曲線に関して明らかではない点で相違する。

しかしながら、半電池における放電曲線の挙動はリチウム二次電池における放電曲線の挙動とほぼ一致すると云えるところ、文献13の「表面処理層を有するリチウム金属酸化物を活物質とする正極と、リチウム金属を対極として用いる半電池において、 $4.3\text{V} \sim 2.75\text{V}$ の電圧範囲で1Cで充放電を実施した際の比放電容量が $152\text{mAh/g}$ であり、放電曲線が比放電容量 $120\text{mAh/g}$ 以上の領域でステップ上の変曲点を3つ有する」(【0060】～【0062】、【0087】、【図6】)旨の記載によれば、文献13発明のリチウムイオン電池の放電曲線は、放電末期の21%以下の領域で本願同様ステップ状の変曲点を3つ有すると云えるから、文献13発明のリチウムイオン電池は、請求の範囲1に係る発明の放電曲線の挙動を有していると云える。

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant<br>MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.  |   |   |

|   |   |   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
|---|---|---|-----------|---------------------|--------------------------|------------|----------|--------------------------|-------------|--|--------------------------|------------|----------------------------|-------------------------------------|-----------|---|--------------------------|------------|-------------------------|--------------------------|-------------|--|-------------------------------------|--------------|---|
| 1.  | This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).   |   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| 2.  | This REPORT consists of a total of 7 sheets, including this cover sheet.  |   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead. |   |   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| 3.  | <p>This report contains indications relating to the following items:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> | <input checked="" type="checkbox"/>   | Box No. I | Basis of the report | <input type="checkbox"/> | Box No. II | Priority | <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input type="checkbox"/> | Box No. IV | Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI | Certain documents cited | <input type="checkbox"/> | Box No. VII | Certain defects in the international application | <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |
| <input checked="" type="checkbox"/>   | Box No. I   | Basis of the report   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input type="checkbox"/>  | Box No. II  | Priority  |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input type="checkbox"/>  | Box No. III   | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input type="checkbox"/>  | Box No. IV  | Lack of unity of invention  |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input checked="" type="checkbox"/>   | Box No. V   | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input type="checkbox"/>  | Box No. VI  | Certain documents cited   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input type="checkbox"/>  | Box No. VII   | Certain defects in the international application  |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| <input checked="" type="checkbox"/>   | Box No. VIII  | Certain observations on the international application   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |
| 4.  | The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).  |   |           |                     |                          |            |          |                          |             |  |                          |            |                            |                                     |           |   |                          |            |                         |                          |             |  |                                     |              |   |

|  |   |
|--|---|
| <p style="text-align: center;">The International Bureau of WIPO<br/>34, chemin des Colombettes<br/>1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 338 82 70</p> | <p>Date of issuance of this report<br/>17 July 2007 (17.07.2007)</p> <p>Authorized officer<br/><br/>Yoshiko Kuwahara</p> <p>e-mail: pt07.pct@wipo.int</p> |
|--|---|



# PATENT COOPERATION TREATY

TRANSLATION

PCT

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

|   |   |   |
|---|---|---|
| <div style="border: 1px solid black; width: 100%; height: 100%;"></div>           |   | Date of mailing<br>(day/month/year)                 |
| Applicant's or agent's file reference<br><b>P041345P0</b>                         |   | <b>FOR FURTHER ACTION</b><br>See paragraph 2 below  |
| International application No.<br><b>PCT/JP2006/300343</b>                         | International filing date (day/month/year)<br><b>13.01.2006</b> | Priority date (day/month/year)<br><b>14.01.2005</b> |
| International Patent Classification (IPC) or both national classification and IPC |   |   |
| Applicant<br><b>MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.</b>                      |   |   |

1. This opinion contains indications relating to the following items:

|                                     |              |  |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the opinion   |
| <input type="checkbox"/>            | Box No. II   | Priority   |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited  |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application   |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application  |

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

|  |                                    |                    |
|--|------------------------------------|--------------------|
| Name and mailing address of the ISA/JP | Date of completion of this opinion | Authorized officer |
| Facsimile No.                          |                                    | Telephone No.      |

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2006/300343

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
  - ☒ the international application in the language in which it was filed
  - ☐ the translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rule 12.3(a) and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material
    - ☐ on paper
    - ☐ in electronic form
  - c. time of filing/furnishing
    - ☐ contained in the international application as filed
    - ☐ filed together with the international application in electronic form
    - ☐ furnished subsequently to this Authority for the purposes of search
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
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**Box No. V** Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

**1. Statement**

|                               |        |      |     |
|-------------------------------|--------|------|-----|
| Novelty (N)                   | Claims | 3, 4 | YES |
|                               | Claims | 1, 2 | NO  |
| Inventive step (IS)           | Claims |      | YES |
|                               | Claims | 1-4  | NO  |
| Industrial applicability (IA) | Claims | 1-4  | YES |
|                               | Claims |      | NO  |

**2. Citations and explanations:**

Document 1: JP, 2004-134207, A (Sony Corp.), 30 April, 2004 (30.04.04), [Claim 1] and [Claim 2], paragraphs [0013], [0015], and [0048]-[0051]  
Document 2: JP, 9-293538, A (Fuji Photo Film Co., Ltd.), 11 November, 1997 (11.11.97), [Claim 3]  
Document 3: JP, 2004-265806, A (Canon Inc.), 24 September, 2004 (24.09.04), [Claim 1], [Example 1]  
Document 4: JP, 2001-76727, A (Sony Corp.), 23 March, 2001 (23.03.01), paragraph [0003]  
Document 5: JP, 2004-362777, A (Hitachi Maxell, Ltd.), 24 December, 2004 (24.12.04), [Claim 2]  
Document 6: JP, 2003-346799, A (Japan Storage Battery Co., Ltd.), 5 December, 2003 (05.12.03), [Claim 1]  
Document 7: JP, 2004-335186, A (Hitachi Maxell, Ltd.), 25 November, 2004 (25.11.04), [Claim 2]  
Document 8: JP, 2003-173776, A (Sony Corp.), 20 June, 2003 (20.06.03), full text  
Document 9: JP, 2003-238165, A (Hitachi Maxell, Ltd.), 27 August, 2003 (27.08.03), [Claim 10], paragraph [0001]  
Document 10: JP, 8-213015, A (Sony Corp.), 20 August, 1996 (20.08.96), [Claim 1]  
Document 11: JP, 2004-335278, A (Nichia Chemical Industries, Ltd.), 25 November, 2004 (25.11.04), [Claim 5], paragraph [0055]  
Document 12: JP, 2004-235144, A (Nichia Chemical Industries, Ltd.), 19 August, 2004 (19.08.04), [Claim 12]  
Document 13: JP, 2004-7299, A (Samsung SDI Co., Ltd.), 10 January, 2003 (10.01.03), [Claim 1], [Claim 11], [Claim 13], and [Claim 14], paragraphs [0056], [0060]-[0062], and [0087], [Fig. 6]

The subject matters of claims 1 and 2 do not appear to be novel or to involve an inventive step in view of document 1 cited in the ISR.

Document 1 describes the invention of "A non-aqueous electrolyte secondary battery having a cathode using as an active material lithium transition metal compound oxides, an artificial graphite anode, a porous polyolefin film intervening between the cathode and the anode, and a non-aqueous electrolytic solution, wherein the cathode contains a first lithium transition metal compound oxide and a second lithium transition metal compound oxide whose mean discharge voltage is lower than that of the first lithium transition metal compound oxide by 0.05V or more as the cathode active material, and the second lithium transition metal compound oxide is contained at a rate of 4 to 50%." (Hereinafter referred to as "Invention of document 1")

"The first lithium transition metal compound oxide" and "the second lithium transition metal compound oxide" correspond to "the first active material" and "the second active material" of the subject matter of claim 2, respectively, since the mean discharge voltage of the second lithium transition metal compound oxide is less than that of the first lithium transition metal compound oxide.

Furthermore, since "capacity of the second active material" of the subject matter of claim 2 is

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

considered to be "weight of the second active material" according to the specification [0024] and an example, the weight (%) of the second lithium transition metal compound oxide of the invention of document 1 includes an overlapped range in a numerical range of the subject matter of claim 2.

So, since the invention of document 1 is an invention similar to the subject matter of claim 2, the discharge curve of the invention of document 1 has at least two step-form inflexion points in a region ranging from 5% or more to 20% or less at a discharging terminal same as the subject matter of claim 1.

The subject matter of claim 3 does not appear to involve an inventive step in view of document 1 and documents 2-7 cited in the ISR

The first active material of the subject matter of claim 3 is well-known as a cathode active material for a non-aqueous electrolyte secondary battery, for example, as described in documents 2-4. Since  $\text{LiMnO}_2$  is well-known as a cathode active material for a non-aqueous electrolyte secondary battery, for example, as described in documents 5-7, a person skilled in the art could have easily employed the cathode active material of the invention of document 1 for "the first active material of the subject matter of claim 3" and " $\text{LiMnO}_2$ ", for example, as described in document 5-7. In this case, the high and low mean discharge voltage value are determined by measuring the mean discharge voltage of "the first active material of the subject matter of claim 3", and " $\text{LiMnO}_2$ ", and as a result, a person skilled in the art could have easily employed "the first lithium transition metal compound oxide" and "the second lithium transition metal compound oxide" of the invention of document 1 for "the first active material of the subject matter of claim 3", and " $\text{LiMnO}_2$ " respectively.

The subject matter of claim 4 does not appear to involve an inventive step in view of documents 1 and 5-7, and documents 8-12 cited in the ISR.

The compound oxide containing Mn of the subject matter of claim 4 is well-known as a cathode active material for a non-aqueous electrolyte secondary battery, for example, as described in documents 8-10. Furthermore since the compound oxide containing Al of the subject matter of claim 4 is well-known as a cathode active material for a non-aqueous electrolyte secondary battery, for example, as described in documents 10-12, a person skilled in the art could have easily employed a cathode active material of the invention of document 1 for "the compound oxide containing Mn or Al of the subject matter of claim 4" and " $\text{LiMnO}_2$ ". A person skilled in the art could have easily employed "the first lithium transition metal compound oxide" and "the second lithium transition metal compound oxide" of the invention of document 1 for "the compound oxide containing Mn or Al of the subject matter of claim 4" and " $\text{LiMnO}_2$ " respectively, by measuring the mean discharge voltage of "the first active material of the subject matter of claim 3", and " $\text{LiMnO}_2$ " respectively in this case.

The subject matter of claim 1 does not appear to be novel or to involve an inventive step in view of document 13 cited in the ISR.

Document 13 describes the invention of "a lithium ion battery having a cathode using a lithium metal oxide having a surface treated layer as an active material, and an anode using a material capable of reversibly inserting/desorbing the lithium ions." (Hereinafter referred to as "Invention of document 13")

The invention of document 13 is different from the subject matter of claim 1, since the subject matter of claim 1 has a regulation related to the discharge curve, but the invention of document 13 does not clarify the discharge curve.

However, behavior of the discharge curve in a half-cell approximately agrees with the behavior of the discharge curve in a lithium secondary battery. Document 13 (paragraphs [0060]-[0062] and [0087], [Fig. 6]) describes the effect that "the specific discharge capacity in the case when charging/discharging is performed with 1C in a voltage ranging from 4.3V to 2.75V is 152 mAh/g

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

and the discharge curve has three-step form inflection points in the region of specific discharge capacity of 120 mAh/g or more in the half-cell using the cathode using the lithium metal oxide having the surface treated layer as the active material and the lithium metal as an antipole.” According to the description, the discharge curve of the lithium ion battery of the invention of document 13 has three-step form inflection points the same as the present application in a region of 21% or less at a discharging terminal. Therefore, the lithium ion battery of the invention of document 13 has the behavior of the discharge curve of the subject matter of claim 1.

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INTERNATIONAL SEARCHING AUTHORITY

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

“Capacity” of claim 2, paragraphs [0007] and [0021] can be a weight according to the description of the specification “the mixing (adding) amount of composition A or B is shown by a weight part.” (Example, comparative example, and [Table 1]) However, “capacity” of the aforesaid description is not the weight, and is unclear since it is understood by the meaning of a discharge capacity, or volume or the like.

Since “100W discharge capacity (%)” and “inflection voltage (V) in discharging” of [Table 1] do not have no explanation what they mean in the specification, the aforesaid description is unclear.





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Date

25.05.07

|  |  |
|--|--|
| Reference  | Application No./Patent No.<br>06711628.5 - 1227 PCT/JP2006300343 |
| Applicant/Proprietor<br>MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. |  |

### Entry into the European phase before the European Patent Office

These notes describe the procedural steps required for entry into the European phase before the European Patent Office (EPO). You are advised to read them carefully: failure to take the necessary action in time can lead to your application being deemed withdrawn.

1. The above-mentioned international patent application has been given European application No. 06711628.5.
2. Applicants **without** a residence or their principal place of business in an EPC contracting state may themselves initiate European processing of their international applications, provided they do so before expiry of the 31st month from the priority date (see also point 6 below).

During the European phase before the EPO as designated or elected Office, however, such applicants must be represented by a professional representative (Arts. 133(2) and 134(1), (7) EPC).

Procedural acts performed after expiry of the 31st month by a professional representative who acted during the international phase but is not authorised to act before the EPO have no legal effect and therefore lead to loss of rights.

Please note that a professional representative authorised to act before the EPO and who acted for the applicant during the international phase does not automatically become the representative for the European phase. Applicants are therefore strongly advised to appoint in good time any representative they wish to initiate the European phase for them; otherwise, the EPO has to send all communications direct to the applicant.

3. Applicants with a residence or their principal place of business in an EPC contracting state are not obliged to appoint, for the European phase before the EPO as designated or elected Office, a professional representative authorised to act before the EPO.  
However, in view of the complexity of the procedure it is recommended that they do so.
4. Applicants and professional representatives are also strongly advised to initiate the European phase using EPO Form 1200 (available free of charge from the EPO). This however is not compulsory.



5. **To enter the European phase before the EPO, the following acts must be performed.**  
(N.B.: Failure validly to do so will entail loss of rights or other adverse legal consequences.)

5.1 If the EPO is acting as **designated or elected Office** (Arts. 22(1)(3) and 39(1) PCT respectively), applicants must, within 31 months from the date of filing or (where applicable) the earliest priority date:

- a) Supply a translation of the international application into an EPO official language, if the International Bureau did not publish the application in such a language (Art. 22(1) PCT and R. 107(1)(a) EPC).

**If the translation is not filed in time, the international application is deemed withdrawn before the EPO (R. 108(1) EPC).**

This loss of rights is deemed not to have occurred if the translation is then filed within a two-month grace period as from notification of an EPO communication, provided a surcharge is paid at the same time (R. 108(3) EPC).

- b) Pay the national basic fee and, where a supplementary European search report has to be drawn up, the search fee; R. 107(1)(c) and (e) EPC).
- c) If the time limit under Article 79(2) EPC expires before the 31-month time limit, pay the designation fee for each contracting state designated (R. 107(1)(d) EPC).
- d) If the time limit under Article 94(2) EPC expires before the 31-month time limit, file the written request for examination and pay the examination fee; R. 107(1)(f) EPC).
- e) Pay the third-year renewal fee if it falls due before expiry of the 31-month time limit (R. 107(1)-(g) EPC).

If the fees under (b) to (d) above are not paid in time, or the written request for examination is not filed in time, the international application is deemed withdrawn before the EPO, or the contracting-state designation(s) in question is (are) deemed withdrawn (R. 108(1) and (2) EPC). However, the fees may still be validly paid within a two-month grace period as from notification of an EPO communication, provided the necessary surcharges are paid at the same time (R. 108(3) EPC). For the renewal fee under (e) above, the grace period is **six** months from the fee's due date (Art. 86(2) EPC).

For an overview of search and examination fees, see the Notice from the European Patent Office dated 1 March 2006, OJ EPO 2006, 192.

- 5.2 If the application documents on which the European grant procedure is to be based comprise more than ten claims, a claims fee is payable within the 31-month time limit under Rule 107(1) EPC for the eleventh and each subsequent claim (R. 110(1) EPC). The fee can however still be paid within a one-month grace period as from notification of an EPO communication pointing out the failure to pay (R. 110(2) EPC).

6. If the applicant had a representative during the application's international phase, the present notes will be sent to the representative, asking him to inform the applicant accordingly.

**All subsequent communications will be sent to the applicant, or - if the EPO is informed of his appointment in time - to the applicant's European representative.**



Date

Sheet 3

Application No. 06711628.5

7. For more details about time limits and procedural acts before the EPO as designated and elected Office, see the EPO brochure

How to get a European patent  
Guide for applicants - Part 2  
PCT procedure before the EPO - "Euro-PCT"

This brochure, the list of professional representatives before the EPO, Form 1200 and details of the latest fees are now all available on the Internet under

<http://www.european-patent-office.org>

Receiving Section

